*Special Subject: Ecology and the Environment*

# COMMANDERS DIGEST

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*By Environmental Quality Chief*

# DoD Ecology Policy Detailed

**ECOLOGISTS' AIM—Preservation of a well-balanced natural environment is the goal of ecology—assuring, among other things, that fishermen will always be able to find well-stocked, unpolluted waters in which to cast their lines. (Florida News Bureau Photo)**

Increased expenditures for pollution control, intensified actions to solve Defense-related ecological problems, and preparation of five-year anti-pollution plans are among several major steps now under way by the Department of Defense to improve the environment.

These actions—plus many others—are what Deputy Assistant Secretary of Defense (Environmental Quality) John A. Busterud recently reaffirmed as vital concerns of his office now and for the future. In addition, Mr. Busterud revealed that the Department of Defense is attacking pollution on three different fronts:

- Considering potential environmental impact in the planning of all its actions;
- Supervising massive cleanup operations, required by Federal and state laws; and
- Conserving some 29,000,000 acres of real estate that the Department controls.

Mr. Busterud cited a dramatic increase in expenditures for Department of Defense pollution-abatement, in both construction and in research and development. He pointed out that the DoD budget for environmental construction has grown from the $18.8 million allocated in Fiscal Year (FY) 1969 to the

$131 million spent in FY 1972 and the $171 million requested for FY 1973. He observed that DoD has increased a budget of less than $19 million for pollution control research and development in FY 1972 to $34 million in the budget request for funds during FY 1973.

The Department of Defense is playing a leading role among the Federal agencies in cleaning up environmental pollution and is taking into account the possible environmental impact of its major strategic, training and logistical decisions, he indicated.

"Secretary Laird has directed the Services to provide five-year plans for pollution-control activities, and such plans have been prepared for upgrading our wastewater treatment facilities, heating plants, incinerators and other environmental facilities," Mr. Busterud said. "We will intensify this work as we identify new problem areas and become more sophisticated in our research for a better environment."

Meanwhile, William D. Ruckelshaus, Administrator of the Environmental Protection Agency (EPA), recently highlighted a number of important issues concerning DoD's anti-pollution efforts.

Mr. Ruckelshaus indicated DoD is making a major contribution to EPA's National Eutrophication Survey, a program designed to sample approximately 1,200 bodies of water throughout the country to determine to what extent phosphates are causing the unnaturally rapid aging of some lakes.

"The Department of Defense is assisting EPA in that survey in several important ways," he said. "One, it has contributed, and is operating and maintaining, two helicopters and two fixed-wing planes which are doing the actual sampling of lake water. The aircraft have been outfitted with special water analysis equipment. Two, the National Guard in several states has helped with the water sampling process; Guardsmen have contributed many man-hours in the public service project."

Mr. Ruckelshaus added, "DoD is also undertaking a study to determine the feasibility of reclaiming used lubricating oil for use again in federally owned vehicles. It is also conducting research into the important area of controlling noise and air pollution from the jet engines of aircraft."

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*Position of Active Leadership*

# Ecological Revolution Affects U. S. Army

**By Henry L. T. Koren**
**Deputy Under Secretary of the Army**

The spirit of ecological revolution, which is capturing the energies of many sectors of our society, is having a similar effect upon the Army. At one time, the Army's environmental program was one of support; it is now being formulated to assume a position of active leadership. That leadership will consist of initiatives that do not just simply comply with minimum standards of environmental legislation, but go beyond to set examples that other institutions and agencies will want to follow.

The environmental issue itself is a "motherhood" issue—no one would oppose clean air, water, and land. Yet, someone has said that the issue lacks structure and direction. To avoid such a shortcoming, the Army's environmental program will be guided by a conceptual framework made up of three simple but highly significant environmental principles:

- The environment is a single system with air, land and water interacting and affecting—and being affected by—the human development placed in the system.
- The environmental system, for planning purposes, is closed; nothing can be "thrown away." Thus, unwanted materials or wastes (pollutants) must be either recycled and reclaimed or confined and contained so they do not migrate to cause other environmental pollution.
- Pollutants are potential resources out of place which, if relocated, can take on renewed value; for example, the nutrients discharged in our lakes, which cause accelerated aging, are valuable when used as fertilizer, and stimulate crop growth when relocated on farm land.

Through the application of these environmental principles, programs that formerly have attempted to deal with

**EYESORE REMOVAL**—Nebraska National Guardsmen remove junk from a field near the town of Panama, in Southeastern Nebraska. (Official U.S. Army Photo)

pollutants either by destroying or disposing of them will be replaced by programs directed towards their reclamation and profitable use.

When planning is governed by these principles, programs show ecologically sound results—the solution of waste problems, instead of the relocation of waste problems. When planning violates any or all of these principles, unacceptable pollution becomes an inevitable result.

For example, incineration of solid wastes violates all the principles because it transforms a solid waste problem to an air and water pollution problem. Although it is argued that the use of air pollution control devices can reduce pollution, the argument usually stems from those who define air pollution only in terms of oxides of sulphur (solid wastes are low-sulphur fuels) and suspended particulates (the emission of which can be mitigated with wet scrubbers and precipitators). They ignore the more serious mercury vapors, hydrocarbons and oxides of nitrogen emissions, which are also products of incineration.

A similar inadequate understanding of water quality problems has given rise to a program of pollution abatement which cannot produce clean water. The popular technique of secondary or biological treatment of wastewater to increase its purity is reasonably efficient only if one considers the 90 percent removal of what is known as Biochemical Oxygen Demand (BOD) and Suspended Solids (SS). Seldom is it realized that a plant that removes 90 percent of the BOD, and, therefore, is considered an efficient purifier, may be removing only 10 percent of the phosphates and little of the soluble heavy metals. The chief of EPA's Bureau of Water Hygiene has pointed out that secondary treatment which does not adequately remove the nitrates, phosphates, heavy metals and viruses can seriously jeopardize public health.

If the pitfalls of partial solutions are to be avoided, environmental problems must be approached in a comprehensive and ecologically sound manner. The Army faces a difficult task in following this Golden Rule of the environment, as its environmental problems are both numerous and complex. To cope with such diversity, the Army must employ its resources across a broad front of activity. In some problem areas, such as flood control and beach erosion, the Army, through its Civil Works Program, will play a dominant or management role. In other areas, such as the Pilot Wastewater Management Program currently underway, the Army will perform a catalytic role, aiding and assisting state and local governments in achieving Federal environmental quality goals. With respect to still other types of environmental problems, the Army will have a resource role. Among the resources which the Army could supply are: skilled personnel; laboratory and other research facilities; land on which to locate waste treatment management facilities; and construction equipment, as well as other related gear.

**'MAKE THE SCENE GREEN' PROJECT—Army National Guardsmen participate in a city-wide haul-away day at Council Bluffs, Nebraska. (Official U.S. Army Photo)**

### Army Attitudes

The Army, as an organization, has been charged in several quarters as being Environmental Public Enemy No. 1. Those charges stemmed from activities such as nerve gas leaks and Corps of Engineers' construction projects. However, basic changes that have been introduced are mitigating those charges. As former Secretary of the Army Stanley R. Resor pointed out, those criticisms, to the extent that they were true, applied to an organization that no longer exists. Recently, Secretary Froehlke placed Army environmental responsibility in the Office of the Deputy Under Secretary of the Army.

That office has accepted the challenge of making the Army the most sophisticated environmental institution practicable. Evidence of a change in viewpoint can be detected in an excerpt from one of the Association of the U. S. Army (AUSA) resolutions for 1973:

". . . We further resolve that we

encourage and endorse the forthright action of the Army in pursuing objectives and programs of conservation and environmental protection within its assigned and adjoining land areas."

Such a resolution is not surprising when one analyzes the results of a recent Army War College poll of some 4,000 officers. As one task, they were asked to list, in order of priority, the 10 greatest dangers to this country. The results were tabulated by years of service—in categories of up to two years of service, three to five years, five to ten, ten to twenty, and over twenty. The results showed that in the first two categories, that is, through five years of service, pollution was listed as the single greatest danger to the United States. Only after those two groups did the variety of threats posed by the Soviet Union or Red China ever reach the top of the list. However, in every category of service tabulated, pollution or "the environment" was included among the list of dangers perceived.

In another poll, the Sierra Club, a leading private environmental organization, reported that a poll of 54,000 black high school seniors on major national issues found that pollution control ranked ahead of elimination of poverty, school desegregation, urban renewal, and crime prevention. Approximately 88 percent of the students wanted increased Federal involvement in pollution control. To the degree in which that sample was representative, it suggests that many of the enlisted men joining the volunteer Army may already be environmentally aware. If so, the Army—its officers and enlisted men—may be well along in stimulating the sentiment necessary for unity in a common cause—a cause to achieve a level of quality in our environment commensurate with the goals and aspirations of American society.

### Case Studies

Specific illustrations can be used to depict the degree of current Army involvement in environmental efforts. The three presented here were selected to illustrate involvement at different geographic scales. On the first level, the Corps of Engineers' Urban Studies Program depicts involvement on a metropolitan scale. Second, Project Clean Up our River Banks (CURB) '72 constitutes involvement with a community and small river basin. Third, the Hunter Liggett Military Reservation project reflects Army efforts to more efficiently manage the wastes produced by its own installations.

### Urban Studies Program

To the old statement, "to govern is to choose," we may add that "to govern well is to provide people with the opportunity to choose from several alternatives." That statement by a past president of the American Association for the Advancement of Science epitomizes President Nixon's efforts to return power to the people. To do so requires the formulation of alternatives or choices. Thus, the Secretary of the Army, acting through the Chief of Engineers, has begun to reorient the Civil Works Program to become more responsive to a new set of national priorities. The new thrust was launched in the March 1971 Pilot Wastewater Management Program for Chicago-Northwest Indiana, Cleveland-Akron, Detroit-Southeast Michigan, San Francisco Bay-Delta, and the Merrimack Basin (Boston) areas.

Purpose of the pilot program is to formulate and assess a range of alternative regional waste treatment management systems, using advanced water treatment and land treatment schemes. Disposal of treated wastes into water—the traditional and most common practice—will be evaluated, along with the lesser known land treatment systems. Land treatment uses the natural processes in aerated soil zones and the growing of crops to recycle pollutants, restoring wastewater to drinking water quality, and preventing unrecycled pollutants from causing further pollution. Each of the alternatives and combinations will be evaluated in terms of its economic, environmental and social effects. Through a planning process which considers all related urban water management issues (the Urban Studies Program), state and local governments are being provided with a range of basic technological choices, and, with those choices, comes power.

The general acceptance of the Urban Studies Program is evident when one takes note of the fact that the five initial pilot areas have been expanded to 23. Areas now actively being studied include a population of approximately 35,000,000 persons. Twelve additional areas are approved for study and are awaiting funds.

### Project CURB '72

The second project, CURB '72, constituted a new adventure in youth involvement with Federal, state and community agencies. The program involves environmental improvement for the Nashua River and its tributaries located in the vicinity of Fitchburg, Massachusetts. The Clean Up our River Banks Project was launched during June 1972 to raise the potential for the employability, or the return to training, of 16-to-19 year-old male and female disadvantaged high school dropouts from approximately 20 towns and cities in the watershed area. By cleaning debris from the river and its banks, constructing small dams as fish havens and removing brush and selected trees to improve the scenic beauty of the rivers and streams, meaningful employment was provided in a way which benefited the entire community.

As the host agency of CURB '72, the U.S. Army at Fort Devens provided the project coordinator with facilities for the project headquarters, non-commissioned officers to serve as work crew supervisors, and a number of trucks and items of construction equipment—with operators—to support the 11 work crews.

### Hunter Liggett Project

In June 1972, work was completed on the construction of a spray irrigation facility on Hunter Liggett Military Reservation, a subpost of Fort Ord, Cali-


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fornia. The facility was constructed as part of a master plan for the post to provide adequate sewage treatment for future permanent construction. In keeping with the national thrust toward recycling and reclamation, land treatment on Army property was selected as the most feasible means of meeting the California Water Quality Control Board requirements. Those requirements specified that no discharge of pollutants could be made into the nearby San Antonio River.

That type of ecologically sound treatment system is consistent with the three basic environmental principles. Not only does the system prevent pollutants from reaching the streams, it also has the advantage of utilizing the pollutants, as a resource out of place, for crop production. At Hunter Liggett, the secondarily treated and disinfected effluent, which still contains nutrients, will be used to increase the growth of native grasses and trees. Environment payoffs, in addition to clean water, include:

- The provision of pleasing green space, in contrast to the usually brown foliage caused by inadequate rainfall;
- The reduction of the potential for forest fires in the area, because of increased water content in the grasses and trees; and
- The provision of habitats for wildlife, thereby increasing the number of birds and the recreational potential of the area.

At Hunter Liggett, the Army is demonstrating to the surrounding region that a goal of zero discharge of pollutants can be attained through proper planning and engineering. This places the Army in the forefront of the new environment standards expressed in the Federal Water Pollution Control Act Amendments of 1972.

### Conclusions

As the Army's Environmental Program advances, it is anticipated that additional examples of meaningful environmental activities will be developed by many segments of the Army. The program will impact favorably, both on the Army and society, and will help to bridge the unfortunate institution gap that had developed. There is every reason to be confident of the Army's success. As French Foreign Minister Maurice Shuman has pointed out, the only mistake that history does not forgive in people is to scorn their dreams. The dream of a clean environment that is sought by the majority of Americans can be realized through the involvement of Army leadership and resources. Clean environment, as a significant dream, will be involved.

*Air Force Ecology Efforts*

# Programs Include Air, Noise and Water Pollution Control

The United States Air Force has been involved in the Nation's efforts to clean up the environment for many years. The tempo of the effort has increased considerably in the last few years with the issuance of Executive Orders 11507 and 11514 and the passage of the National Environmental Policy Act, the Clean Air Act Amendments of 1970, and, most recently, the 1972 Amendments to the Federal Water Pollution Control Act.

Although the initial efforts were concerned with air and water pollution control programs, they have been expanded to include such areas as noise control, land-use planning and solid waste disposal.

### Reducing Air Pollution

Air Force sources of air pollution are divided into two categories, those unique to the Air Force and those which are not. The first category includes aircraft missiles, aircraft and rocket engine test facilities and crash-rescue training facilities. The more common sources are heating plants, fuel storage facilities and automotive vehicles.

For aircraft engine test facilities and crash-rescue training facilities, control technology must be emphasized. A source control program must be designed and accomplished.

The civilian aircraft industry, in cooperation with the Department of Defense, has already developed engine combustors which do not "smoke." Air Force jet engines will also use smokeless combustors. Unfortunately, they are not the final answer to aircraft pollution problems. Invisible pollutants, like carbon monoxide, will continue to be discharged into the air.

The Aero Propulsion Laboratory at Wright-Patterson Air Force Base, Ohio, is conducting an active research and development program to find ways of measuring and eliminating both the visible and invisible pollutants from Air Force jet engines.

This includes a project to find ways of eliminating carbon monoxide and hydrocarbons emitted by aircraft at low power; development of a laser system for detecting and measuring pollutant levels in engine exhausts without actually sampling the gas stream; and studies of fuel additives for eliminating both smoke and oxides of nitrogen from exhausts.

The Environics Branch of the Air Force Weapons Laboratory has developed a water-spray system which virtually eliminates smoke generated by crash-rescue training fires. When prototyping and testing are completed, the Air Force hopes to install the devices Air Force-wide, permitting firefighters to maintain proficiency without adding pollution to the already burdened atmosphere.

Other programs include: operational controls during missile launches to prevent pollutants from reaching base boundaries in dangerous concentrations; the establishment and operation of a source-sampling team at the Environmental Health Laboratory, McClellan Air Force Base, California; an active program for control of air pollution from Government-owned, contractor-operated plants; use of no-lead or low-lead gasoline in automotive vehicles; and initiation of development of a toxic aerosol control facility to scrub rocket engine exhausts.

The Air Force established a $44 million program in 1968 to build new, cleaner, heating plants and incinerators, and to improve existing ones through 1973.

Low pollution fuels are used, and rigid precautions are taken to insure that fuel vapors do not leak into the air from stor-

age tanks.

Open burning of trash is also prohibited on Air Force bases, thus alleviating what once was a major contributor to air pollution.

### Reducing Water Pollution

The water available for use by the United States remains at a fixed level. In many areas of the country, it is constantly being used and reused. In heavily populated and industrial sections, where the demand for water constantly increases, the problem is particularly acute. For example, it is estimated that each individual requires over 73 gallons of water per day for personal use. By 1980, according to this estimate, water required for personal use will increase to over 77 gallons per day.

Recognizing the increasing demand for, and decreasing supply of, clean water, the Air Force is helping to fight water pollution. An ambitious battle was underway as early as 1967, with wastewater treatment facilities on Air Force installations as the prime goal. By 1973, the Air Force will have spent almost $70 million to expand, improve or create adequate sewage and industrial waste treatment plants in the United States and overseas.

The ultimate goal is to eliminate all pollutants from any wastewaters discharged from Air Force installations into surrounding waters. The immediate objective is to insure that all wastewaters are treated so as to comply with the most stringent standards either by connection to regional or local disposal systems or by the installation of advanced waste treatment.

All installations in the continental United States (CONUS) and most overseas installations now have either secondary wastewater treatment or are connected to regional systems. Seventy-two Air Force and 50 Air National Guard (ANG) installations are connected to local systems.

For 47 other USAF and 13 ANG facilities, where regionalism is feasible, every effort will be made to connect to local systems. Advance waste treatment, as required, will be programmed for 117 remaining USAF and 14 ANG facilities.

**KICKING THE HABIT—In this demonstration flight, smoke billows from the port engines of an Air Force C-5 Galaxy while two modified TF39 engines on the other side of the plane are smoke-free.**
**(Official U.S. Air Force Photo)**

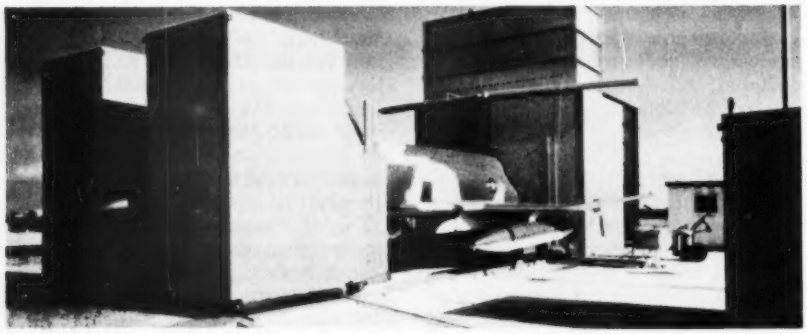
### Solid Waste Management

The Air Force must collect and dispose of some 100,000 tons of solid waste per month from its CONUS bases. In order to solve the problems of lagging technology, high costs and pollution hazards, the following goals and objectives have been established:

- Awarding multi-year contracts for solid waste disposal;
- Conducting of in-depth studies of solid waste handling;
- Reducing and recycling of solid wastes generated at bases;
- Developing a family of refuse collection and disposal equipment; and
- Better training for solid waste management personnel.

The Air Force has an active program aimed at accomplishing those goals. An in-depth study is now underway to determine the best solid waste processing and disposal techniques. In addition, 14 bases are conducting six-month recycling pilot programs to reduce or recycle paper, glass and metal.

Solid waste disposal is currently effected by joining regional community-wide solid waste management systems, contracting for removal, or by incineration or sanitary landfill.



**SOUND SUPPRESSION—At various bases, the Air Force has installed some 20 sound suppression systems—devices which reduce jet engine noise by approximately 99 per cent.**
**(Official U.S. Air Force Photo)**

### Reducing Noise Pollution

The problem of noise—as a disturbance to the human environment—has been receiving increasing attention in the

Air Force. The problem of noise is not confined to aircraft, but includes noise resulting from the operation of machinery and equipment in general use on Air Force bases: moving vehicles, jackhammers, lawnmowers, power-generating plants, and the like.

In confined indoor areas which house machinery, noise is a distinct problem for concern. The Air Force's computer complexes, for instance, now have—or soon will have—noise abatement investigation personnel.

But, it is aircraft noise which primarily affects both Air Force personnel and the general public. The Air Force has undertaken a program to provide sound-suppression equipment for all power check pads and engine test stands at bases supporting F/FB-111, F/RF-4, and A-7 aircraft. For typical one-engine run-ups, the sound suppressors effectively reduce the area exposed to hazardous noise from approximately 7 million square feet to 200 thousand square feet. Through FY 1974, $36 million will be spent to suppress ground-level engine noise.

The Air Force has long sought to minimize the aircraft noise problem through operational procedures. This includes careful planning of supersonic flight paths and routes, and, where necessary, the curtailment or alteration of aircraft activity.

A number of areas are being explored for future alleviation of noise. An Air Installation Compatible Use Zone (AICUZ) concept will attempt to restrict community development in areas near Air Force bases which are subject to predictably high noise levels. Continuing research programs on methods of making quieter jet engines and aircraft designs will influence future Air Force weapons systems.

**Control of Hazardous Substances**

For years the Air Force has been handling dangerous toxic rocket propellants with an almost accident-free spill record. The goal is to develop the same sort of program for handling and disposing of oil and less dangerous material.

Oil handling equipment maintenance has been improved and oil separator or catchment devices have been placed to intercept and prevent oil run-offs from leaving base boundaries.

Projects have also been initiated to study waste disposal from washrack, petroleum, oils and lubricants (POL), photographic and toxic propellant operations.

Comprehensive spill contingency plans now being developed will provide rapid-reaction capability to contain hazardous material spilled by chance. All facilities will be equipped with devices that will collect oils escaping from work areas and prevent them from seeping off base via natural drainage courses.

Pest control programs will be upgraded to reduce chemical use by increased use of biological control or other non-chemical methods of control. Certain pesticides have been banned and a school has been set up for field-level pest control technicians.

**Summary**

Just as any other large organization does in conducting wide-ranging activities, the Air Force unavoidably contributes to air, water, and noise pollution. It also creates solid waste. By-products generated by base housing, aircraft wash racks, photo laboratories and dispensaries are only a few of the many pollutants created by routine airbase and housekeeping activities. But those sources and others are being controlled to the extent possible without affecting mission accomplishment. When local pollution standards are tougher than Federal standards, the Air Force meets the tougher standards.

The Federal Government has set the standards and the pace for protecting the environment. Air Force research, equipment and manpower will continue to devote much time and effort to improving the environment. Air Force environmental officials, working closely with local authorities, monitor Air Force efforts to make sure they do not add to local pollution problems. The Air Force feels that its responsibility in environmental protection does not end at a base's front gate.

*Unique Environmental Problems*

# Navy Ecology Programs Cover Broad Range

Compared to the other Military Departments, the Navy has some unique environmental problems, as well as a far broader range of ecology problems. Like the other Services, the Navy and the Marine Corps have air bases, large land training areas and numerous buffer zones.

In addition, the Navy operates a large fleet of ships with people and equipment heavily concentrated in limited living and working space. A Navy ship is, therefore, a microcosm of a small city, including all related pollution problems.

Furthermore, most Navy bases are located around well-established metropolitan large port areas that have special pollution problems of their own, not the least of which are adequate facilities.

To cope with those problems, the Navy has engaged in a massive effort, spending more than any other Federal agency for the job of cleaning up its facilities. In 1971, the Navy spent $30 million. In 1972, it spent $66 million, and, in 1973, it plans to spend more.

Within the next few years, the Navy will be spending about $400 million—approximately two percent of the Navy budget—on pollution abatement, both in direct costs and in hidden costs, such as the operation and maintenance of waste treatment facilities and the increased costs of pollution-free ships and aircraft engines.

Up to now, the Navy has spent most of its money on shore-based pollution projects such as sewage and industrial waste treatment facilities, smoke scrubbers and aircraft noise suppressors. Basically, its shore-based pollution problems will be solved in the next few years.

There will be continuing pollution abatement projects, as old devices wear out and as new standards are adopted, but the backlog of problems will have been eliminated.

The Navy's next big problem is what to do with shipboard waste materials. They include various liquid discharges

from ships. A decision has been made to extend sewer pipes to most of the piers at major naval bases, starting in 1973. The project should be completed in two years. At the same time, the Navy will modify wastewater piping systems on 150 ships, with more to be modified in later years.

Another serious problem concerns oil pollution of oceans and harbors. The President has set as a goal the elimination of all intentional discharges of oil at sea by mid-decade or by 1980 at the latest.

The Navy has a number of projects underway. They include testing oil and water separators for ships and flexible membranes for ballast tanks. Shore work involves developing tanks to pump bilge and ballast water. Also being developed are audible alarms, magnetic shut-off valves and automatic overflow transfer devices to reduce the possibility of oil spills through human error.

In the event spills still occur, Navy field organizations have new contingency plans, plus more and better equipment for quick-response cleanup work. A Navy ship generates approximately three pounds of trash per man per day. On a large aircraft carrier, that means 7.5 tons a day. Present rules prohibit taking anything out to sea for the purpose of dumping. Disposal at sea of trash generated aboard the ship while underway is still permitted past 50 miles. Rules also forbid dumping of garbage within 12 miles of shore. The solution? The Navy is currently field-testing several compaction devices and incinerators that would reduce the residue of trash that has to be disposed of at sea.

**UNDERGOING TESTS—This water anti-pollution device is undergoing tests by fuel division workers at the Bermuda U. S. Naval Air Station Annex.**
**(Official U.S. Navy Photo)**

### Oceanography

Many talk about the oceans as dying, but nobody really knows how much the oceans can absorb before their environmental balance is tilted irrevocably. More than one-third of all oceanography work conducted in the United States today is funded by the Navy. Some of the Navy's work may help point to the answers.

### Cooperation

Pollution control is only a part of the Navy's total environmental program. At more than 80 bases, the Navy and Marine Corps have cooperative management agreements with Federal and state conservation agencies for preservation and enhancement of the ecological balance at those bases.

At Norfolk, Virginia, the Navy has built a steam-generating incinerator which burns trash collected on the base. This is a unique recycling effort. Steam from the incinerator is then pumped to the piers to provide power and heat for ships in port. In addition, the system helps to reduce a very visible form of air pollution—but the requirement of ships to blow their tubes when their boilers are in use still exists.

Another innovation has been developed by the Navy Research Laboratory at Annapolis, Maryland. A Navy scientist there has developed a new kind of anti-fouling paint for ships. The new paint leeches little toxic material. If tests are successful, the paint will have a very beneficial effect on the environment of the Nation's ports and inland waterways.

### Attitude Important

In addition to these few representative examples of its innovative efforts, the Navy has also been attempting to encourage an environmental enhancement attitude throughout the Navy and Marine Corps. Environmental awareness is being developed through extensive use of environmental material in internal information media and appropriate training course material.

**SCOOPAMARAN—A Navy seaman holds the wire mesh scoop of a Scoopamaran in an up position as his mate removes a tire collected during a cleanup operation at San Diego Naval Station.**
**(Official U.S. Navy Photo)**

The Navy is also trying to communicate to all of its shore stations practical ideas on how to organize volunteer recycling efforts and how to assist them after they get started.

The Navy Exchange System has undertaken a supporting role by encouraging customers to use recycled material. The Exchange has embarked on a large-package waste-recycling program. Meanwhile, individuals and bases throughout the Navy have also distinguished themselves in that area by conducting recycling efforts hand-in-hand with local communities.

Admiral Elmo R. Zumwalt, Chief of Naval Operations, pointed up the Navy's course in the area of ecology and environmental protection in a recent message to the Navy announcing the initiation of "Ecology Spot Reports"—(Z-Gram 114).

In the Z-Gram, dealing with a worldwide Navy system of reporting environmental phenomena, the Admiral said, "Environmental protection is of great importance to the world at large, to our Nation and to the Navy. It is a matter of personal concern to me and I am confident that Navymen everywhere share this concern."

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